

CORRECTED VERSION

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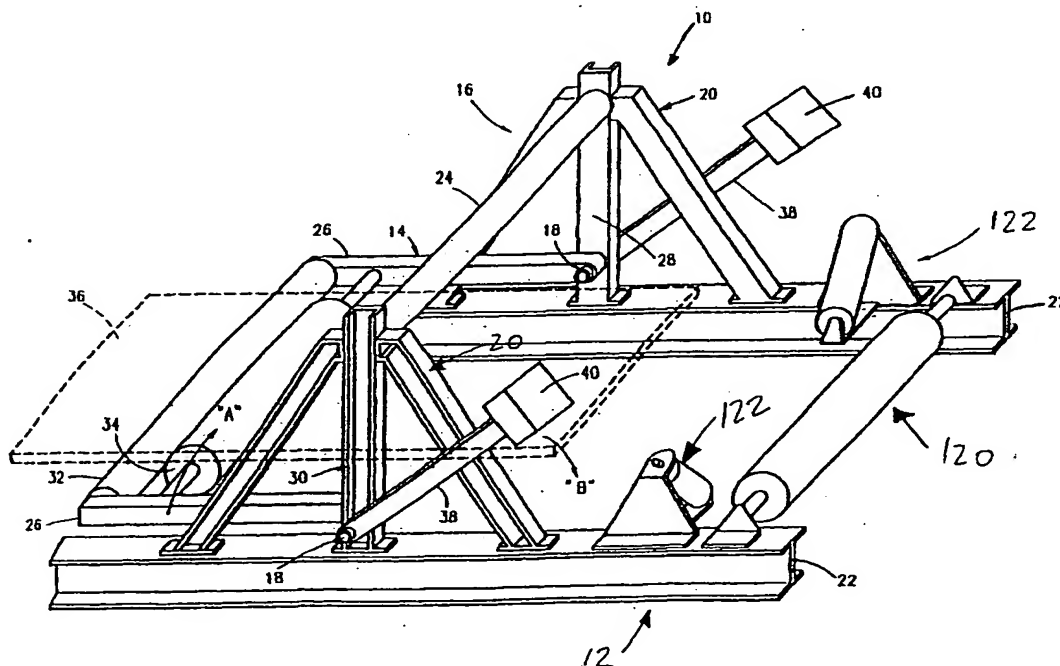
11 July 2002

(15) Information about Correction:

see PCT Gazette No. 28/2002 of 11 July 2002, Section II

[Continued on next page]

(54) Title: RETAINING DEVICE FOR A CONVEYOR BELT ASSEMBLY



(57) Abstract: A retaining device (10) for a conveyor belt assembly (12) which includes a clamping means (14) for clamping a conveyor belt (36) of the conveyor belt assembly; and a biasing means (38, 40) for displacing the clamping means between an inoperative condition and an operative retaining condition wherein the clamping means clamps a part of the belt to tension a material carrying portion of the belt in the event of a loss of tension in the belt.

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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## RETAINING DEVICE FOR A CONVEYOR BELT ASSEMBLY

5

This invention relates to a retaining device for a conveyor belt assembly.

10 A problem associated with a conventional conveyor belt assembly may occur when the belt breaks resulting for example, in spillage of the matter or articles carried by the belt assembly onto the floor thereby leading to a substantial down-time of the assembly. In particular, fixing of the belt would include first removing all the remaining material off the belt, pulling the ends of the belt together over what may be a significant distance depending on the length of the belt and thereafter resplicing the ends of the belt together. The applicant  
15 believes that a need exists for a retaining device which would limit the travel of the belt upon breakage of the belt thereby preventing a major portion of the belt from landing on the floor and consequent spillage of material.

According to the invention there is provided a retaining device for a conveyor belt assembly which includes:

20 a clamping means for clamping a conveyor belt of the conveyor belt assembly; and  
a biasing means for displacing the clamping means between an inoperative condition and an operative retaining condition wherein the clamping means clamps a part of the belt to tension a material carrying portion of the belt in the event of a loss of tension in the belt.

25 The clamping means may include a support member and a clamping member which is mounted displaceably thereon. The clamping member may be pivotally or slidably mounted on the support member.

The support member may be mountable on a support frame of the conveyor.

30

5 Complementary clamping formations may be provided on the clamping and support members to facilitate clamping of the belt therebetween in the operative retaining condition. The clamping formations may be configured to span a major part of a width of the belt.

The clamping and support members may be generally "U"-shaped, the clamping member preferably being adapted to move the belt towards and in to engagement with the support member in the retaining condition.

The biasing means may include a weighted arm which is connected to the clamping member for displacing the clamping member towards the retaining condition under the operation of gravity.

The biasing means may alternatively include a spring arrangement which is adapted to displace the clamping member towards the support member in the operative retaining condition.

20 According to another aspect of the invention there is provided a conveyor belt assembly which includes one or more retaining devices as described herein. The retaining devices are preferably arranged on a support beam of the conveyor assembly, preferably within 20 meters, typically 3 meters, within a head or drive roller of the assembly. The retaining devices may be arranged on an upper- and/or under-side of the support beam.

The invention will now be described by way of example with reference to the accompanying drawings.

30 In the drawings,

5 Figure 1 shows a three dimensional view of a retaining device in accordance with the invention;

Figure 2 shows a sectioned three dimensional view of the retaining device of Figure 1;

Figures 3 to 5 show a schematic side view of the retaining devices in accordance with the invention in an inoperative condition; at an initial stage following a loss of tension in a belt  
10 of a conveyor assembly and an operative retaining condition respectively;

Figures 6 to 9 show enlarged top, bottom and end views of parts of the retaining devices shown in Figures 3 to 5 taken in the direction of the arrows shown along lines 6-6, 7-7, 8-8, 9-9, respectively as indicated in Figure 3; and

Figures 10 and 11 show enlarged front views of parts of the retaining devices shown in  
15 Figures 3 to 5.

Referring now to the drawings, reference numeral 10 generally designates a retaining device for a conveyor belt assembly 12 in accordance with the invention.

20 The retaining device 10 includes a clamping means comprising a clamping member 14 which is mounted pivotally on a support member 16 by pivot members 18.

The support member 16 includes a pair of spaced side supports 20 each having three legs, are connected to longitudinally extending beams 22 of a support frame of the conveyor  
25 assembly 12. The support member 16 further includes a rod or tube 24 which extends between the upper end regions of the side supports 20.

The clamping member 14 includes a pair of side arms 26 which are pivotally connected at one of their ends to the inner sides 28 of the central legs 30 of the side supports 20. The  
30 clamping member 14 further includes a rod or tube 32 which extends between the other ends of the side arms 26. A guide roller 34 for supporting a belt 36 of the conveyor assembly 12

5 extends between the side arms 26 at a position spaced away from the end of side arms 26 where the rod 32 is located. A biasing means in the form of extension arms 38 having weights 40 at their ends, are connected to the said one ends of the side arms 26 via the pivot members 18 for displacing the clamping member 14 between an inoperative condition (as shown in Figure 1) and an operative retaining condition (as shown in Figure 2) wherein the belt 36 is  
10 clamped between the rods 24 and 32 to tension a material carrying portion of the belt 36 in the event of a loss of tension in the belt 36. In particular, in the event that the belt 36 breaks, the loss in tension in the belt 36 permits pivotal displacement of the clamping member 14 and with it the belt 36, in the direction of arrow "A" towards the retaining condition by the biasing means as the extension arms 38 and weights 40 pivot towards the ground under the operation  
15 of gravity in the direction of arrow "B".

Referring now to Figures 3 to 11, reference numerals 110 and 112 generally refer to retaining devices for a conveyor belt assembly 12 in accordance with the invention. It is to be understood that like reference numerals used in Figures 1 and 2 shall refer to like parts in  
20 Figures 3 to 11, unless the contrary is clear from the context.

As is apparent from the drawings, retaining devices 110 and 112 are mounted respectively on an operative upper- and under-side of the beams 22 of the support frame of the conveyor assembly 12. In the case of the retaining device 112 however, the clamping  
25 member 14 does not require a biasing means in the form of extension arms 38 having weights 40 at their ends as is the case with retaining devices 10 and 110, since upon a loss of tension in the belt 36, the clamping member 14 pivots naturally under the operation of gravity in the direction of arrow "C" towards the retaining condition shown in Figure 5.

30 As can be seen in Figures 6 and 9, cross-bracing members 114 are provided to strengthen and aid stabilisation of the support members 16, the cross-bracing members 114 being connected, typically welded, to gussets 116 at the bases of the diagonally opposing legs 118 of the side supports 20.

- 5 The conveyor assembly 12 includes guide rollers 120 and 122 arranged on the beams 22 to guide the belt 36 during normal operation.

In normal operation as shown in Figure 3 with the belt 36 moving in the direction of arrow "D", the belt 36 rests on and is guided by the guide rollers 34, 120 and 122. The applicant has found through observation and experiment that as most breakages or severing of the belt 30 occurs within 20 m and typically within 3 m of the head and/or drive roller (not shown) which is typically located at the highest point or end of the conveyor assembly 12, the retaining devices 110 and 112 are arranged within 3 to 20 meters of the said head and/or drive roller. Accordingly, as the belt 36 breaks, the consequent loss in tension therein leads to the pivotal displacement of the clamping members 14 and with it the belt 36 in the direction of arrows "A" and "C" (as shown in Figure 4) towards the retaining condition (Figure 5) wherein the belt 36 is clamped and retained between the rods 24 and 32 thereby to inhibit spillage of for example, material being carried or transported thereon. The retaining devices 110 and 112 thus serve to retain the belt 36 in a tensioned condition at its new "free or severed ends" following breakage of the belt 36 to facilitate the removal of the material therefrom and subsequent repair of the belt 36 *in situ*.

It is to be appreciated that any number of retaining devices 110 and 112 can be arranged on the conveyor assembly 12 according to a user's needs and/or the configuration of the conveyor assembly 12 such as for example the length of the belt 36.

In another embodiment of the invention (not shown), a suitably weighted or spring biased clamping rod may be mounted slidably on the support 20 at least partially above roller of the conveyor assembly 12 so that in the event of detection of a loss of tension in the belt 36 by any suitable tension detection device, the clamping rod would be moved under operation of gravity or by the spring into a clamping condition wherein the belt is clamped and retained in position between the rod and the roller.

5

The applicant believes that the retaining device in accordance with the invention is advantageous in that it provides a simplified, robust, time saving and cost effective means of inhibiting spillage of material carried by the belt 36 when the belt 36 breaks:

10

The retaining device in accordance with the invention is not limited to the precise constructional details as hereinbefore described. For example, The rods 24 and 32 may be rotatably mounted on the supports 20 and arms 26 respectively and may be of any suitable cross-sectional shape or length



## 5 Claims:-

1. A retaining device for a conveyor belt assembly which includes  
a clamping means for clamping a conveyor belt of the conveyor belt assembly; and  
a biasing means for displacing the clamping means between an inoperative condition  
10 and an operative retaining condition wherein the clamping means clamps a part of the belt to  
tension a material carrying portion of the belt in the event of a loss of tension in the belt.
2. A retaining device as claimed in claim 1 wherein the clamping means includes a  
support member and a clamping member which is mounted displaceably thereon.
- 15 3. A retaining device as claimed in claim 1 or 2 wherein the clamping member is pivotally  
mounted on the support member.
4. A retaining device as claimed in claim 1 or 2 wherein the clamping member is slidably  
mounted on the support member.
5. A retaining device as claimed in any one of claims 2 to 4 wherein the support member  
is mountable on a support frame of the conveyor.
- 25 6. A retaining device as claimed in any one of claims 2 to 5 wherein complementary  
clamping formations are provided on the clamping and support members to facilitate clamping  
of the belt therebetween in the operative retaining condition.

5

7. A retaining device as claimed in claim 6 wherein the clamping formations are configured to span a major part of a width of the belt.

8. A retaining device as claimed in any one of claims 2 to 7 wherein the clamping and support members are generally "U"-shaped, the clamping member being adapted to move the belt towards and in to engagement with the support member in the retaining condition.

9. A retaining device as claimed in one of claims 2 to 8 wherein the biasing means includes a weighted arm which is connected to the clamping member for displacing the clamping member towards the retaining condition under the operation of gravity.

10. A retaining device as claimed in any one of claims 2 to 8 wherein the biasing means includes a spring arrangement which is adapted to displace the clamping member towards the support member in the operative retaining condition.

20

11. A new retaining device as herein described.

12. A retaining device as herein described and as illustrated with reference to the accompanying drawings.

- 5 13. A conveyor belt assembly which includes one or more retaining devices as claimed in  
any one of the preceding claims.
14. A conveyor belt assembly as claimed in claim 13, wherein the retaining devices are  
arranged on a support beam of the assembly within a range of 20 meters, typically 3  
10 meters, within the head or drive roller of the assembly.
15. A conveyor belt assembly as claimed in claim 13 or 14, wherein the retaining devices  
are arranged on an upper- and/or under-side of the support beam.

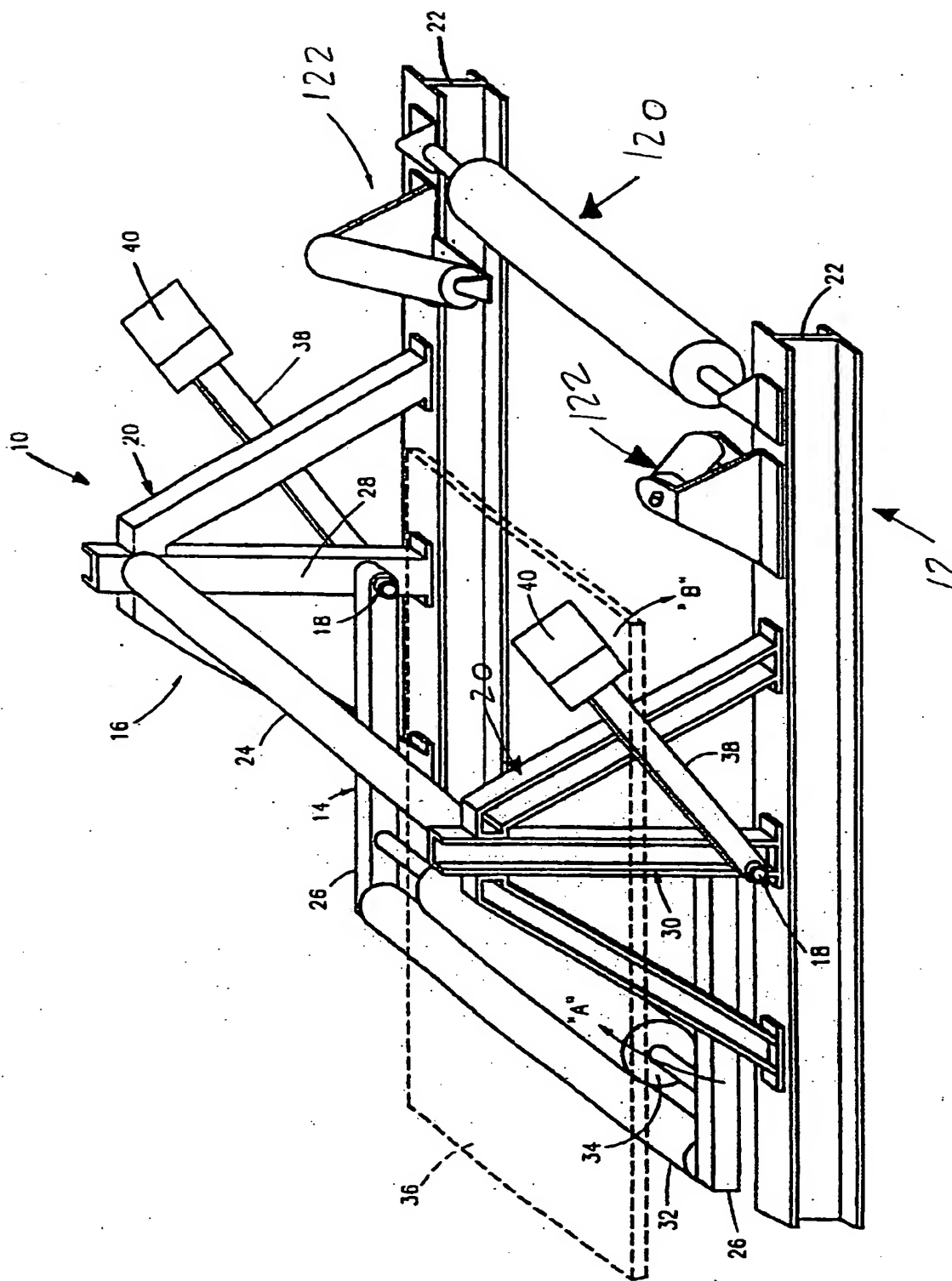


Figure 1

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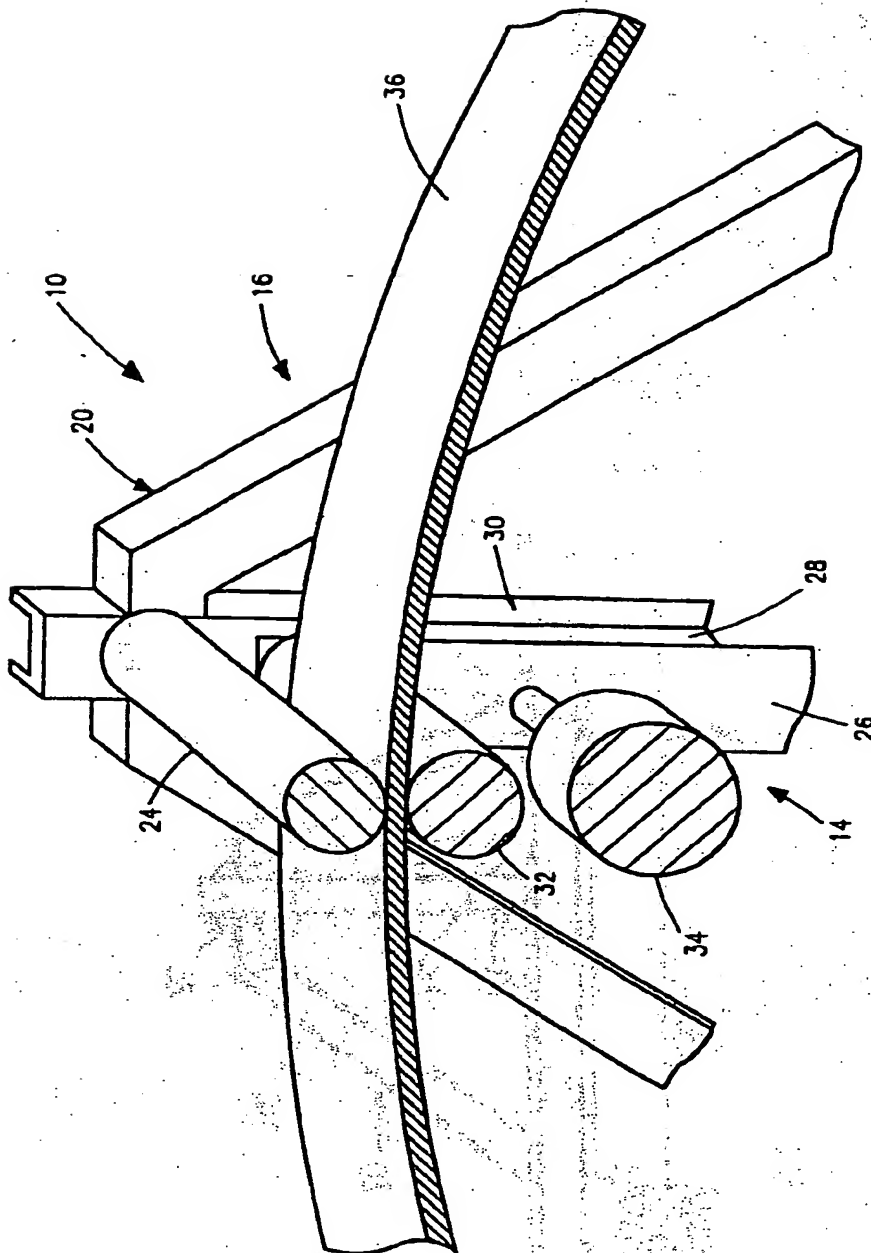


Figure 2

3/11

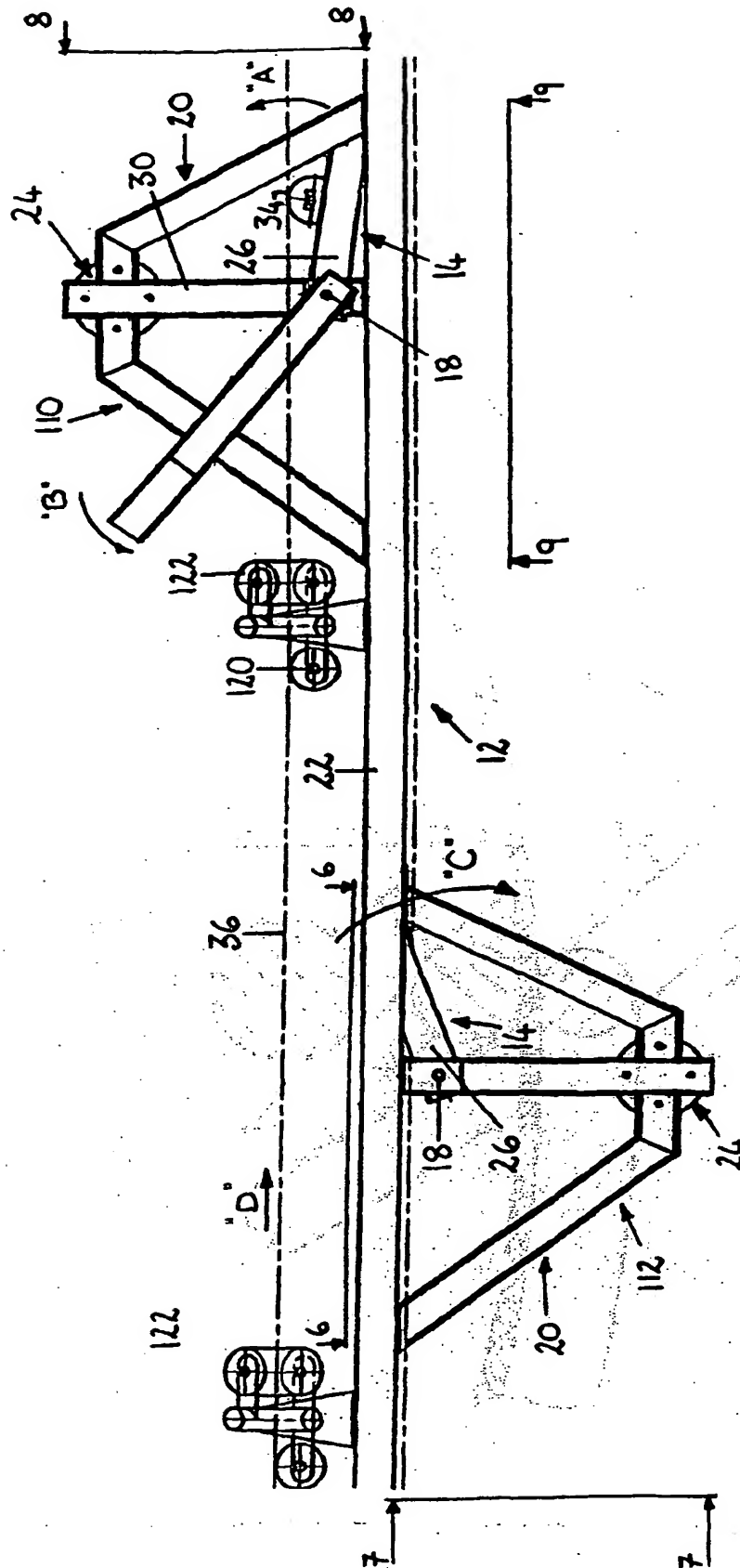


Figure 3

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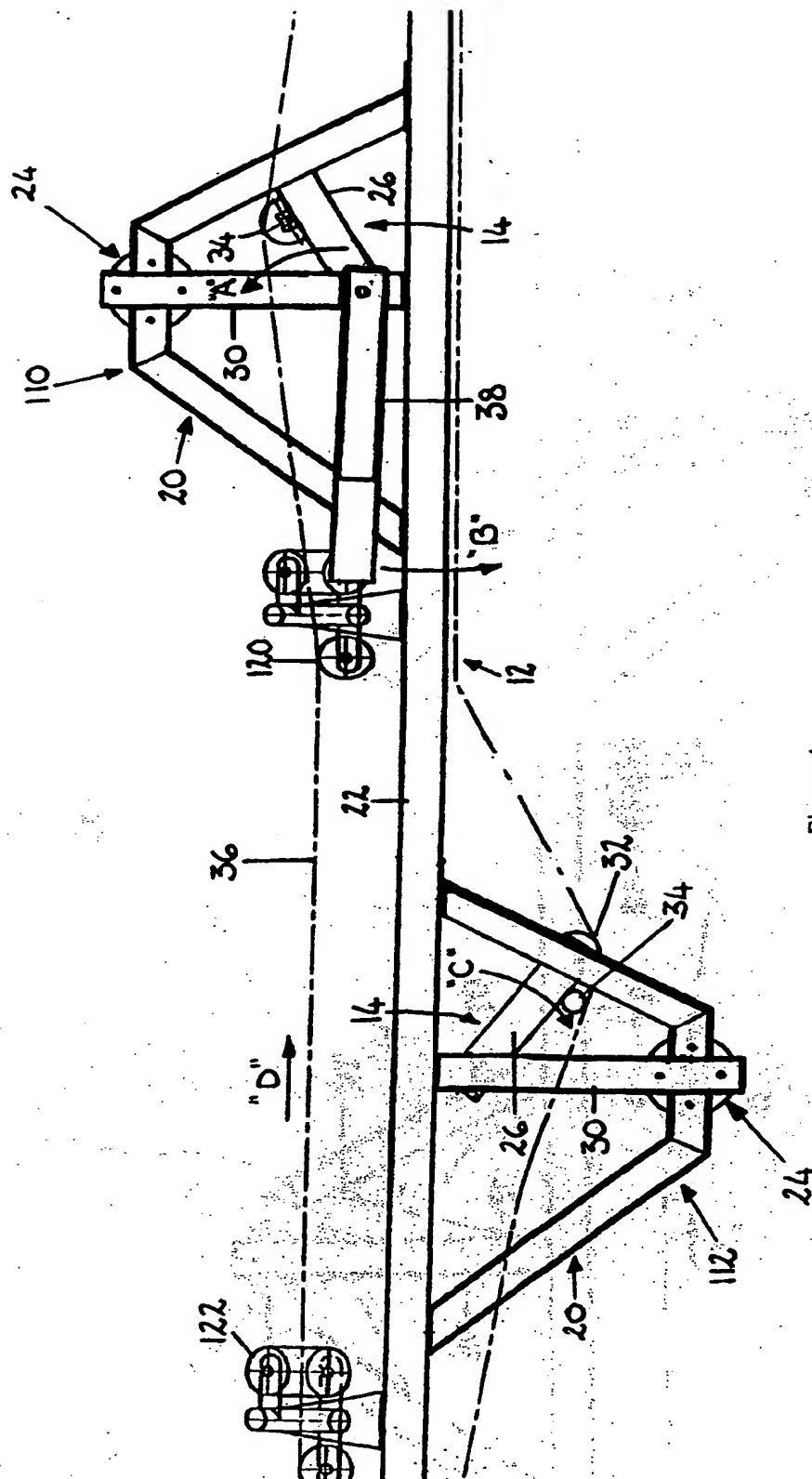


Figure 4

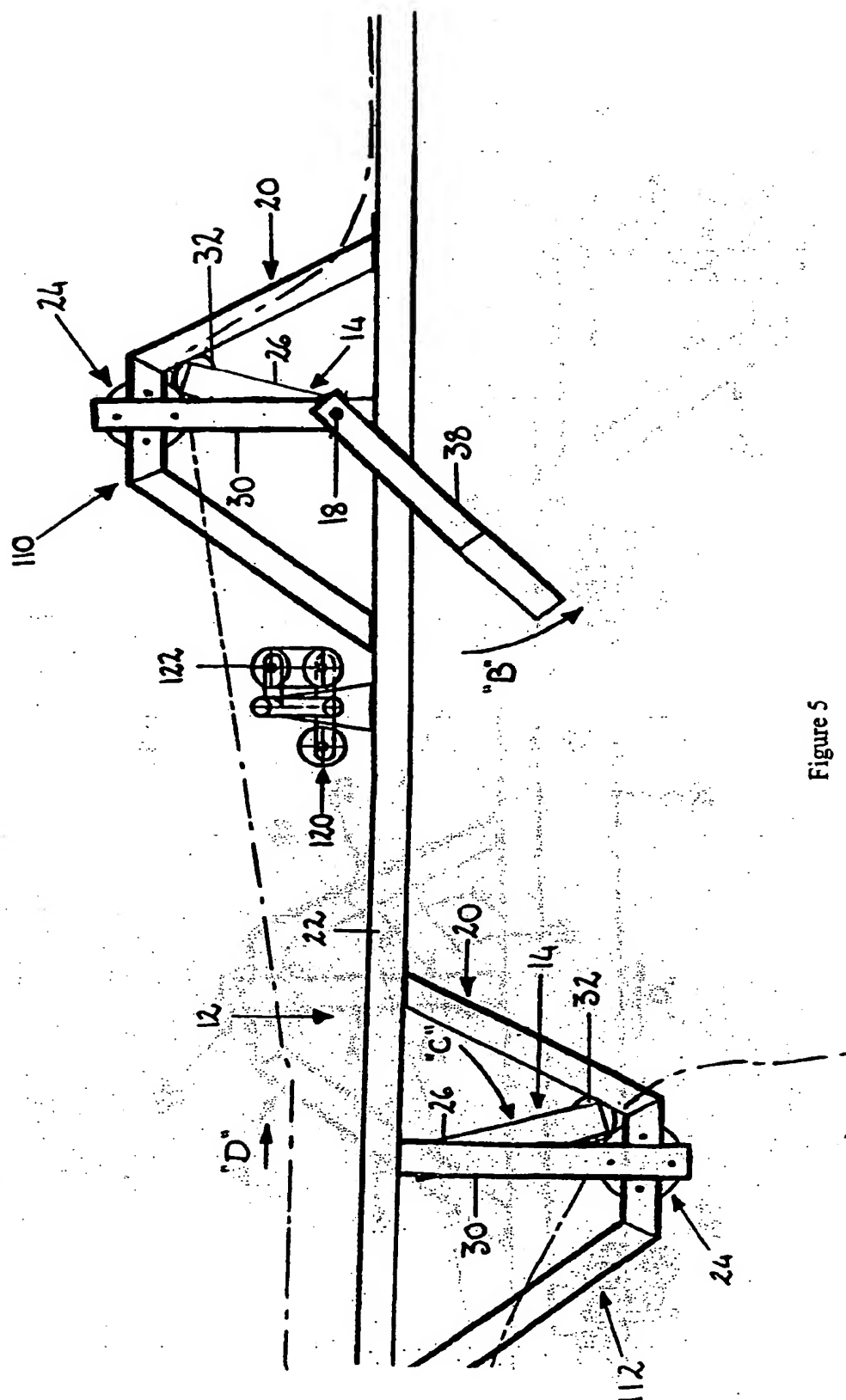


Figure 5



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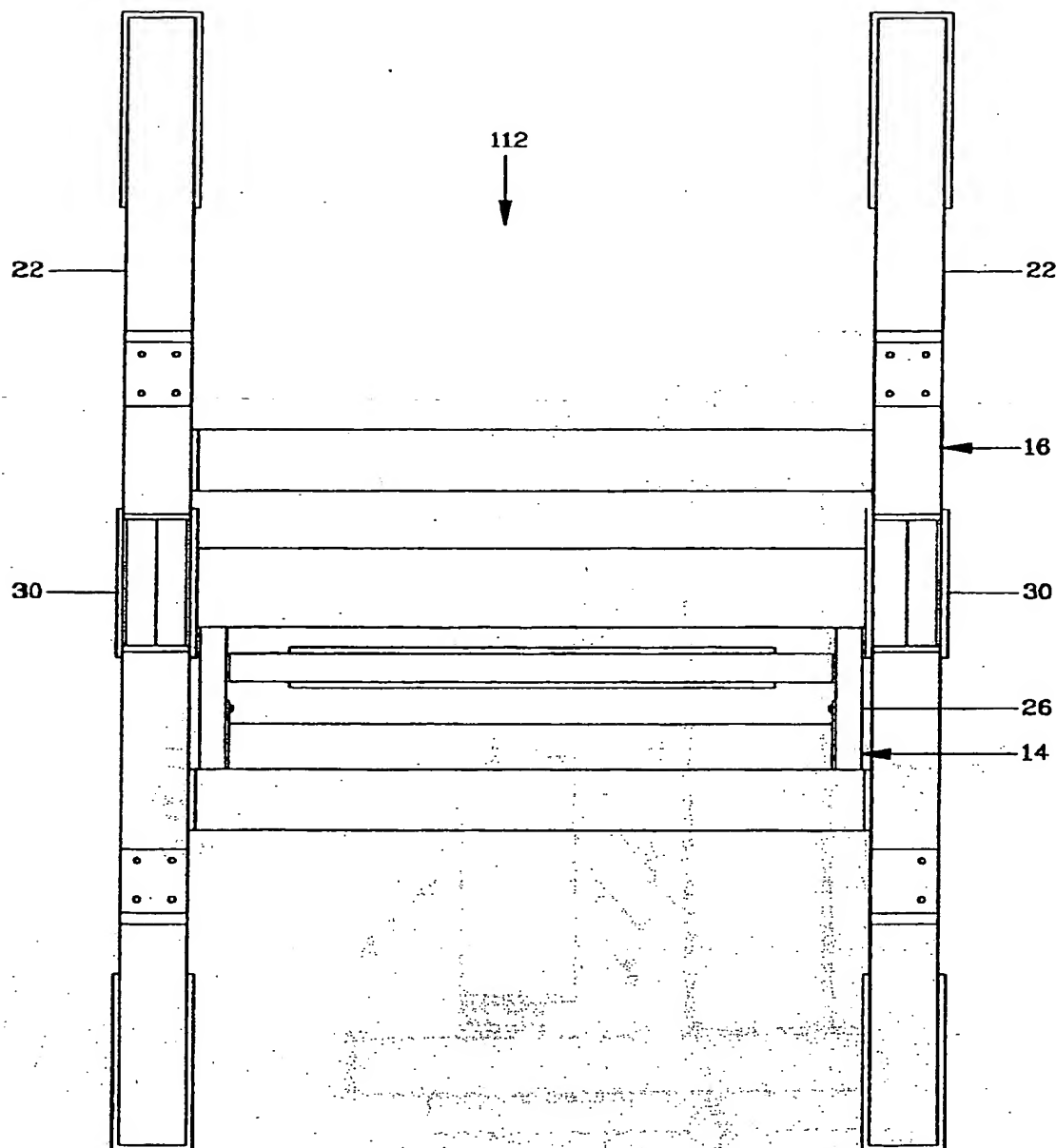


Figure 6

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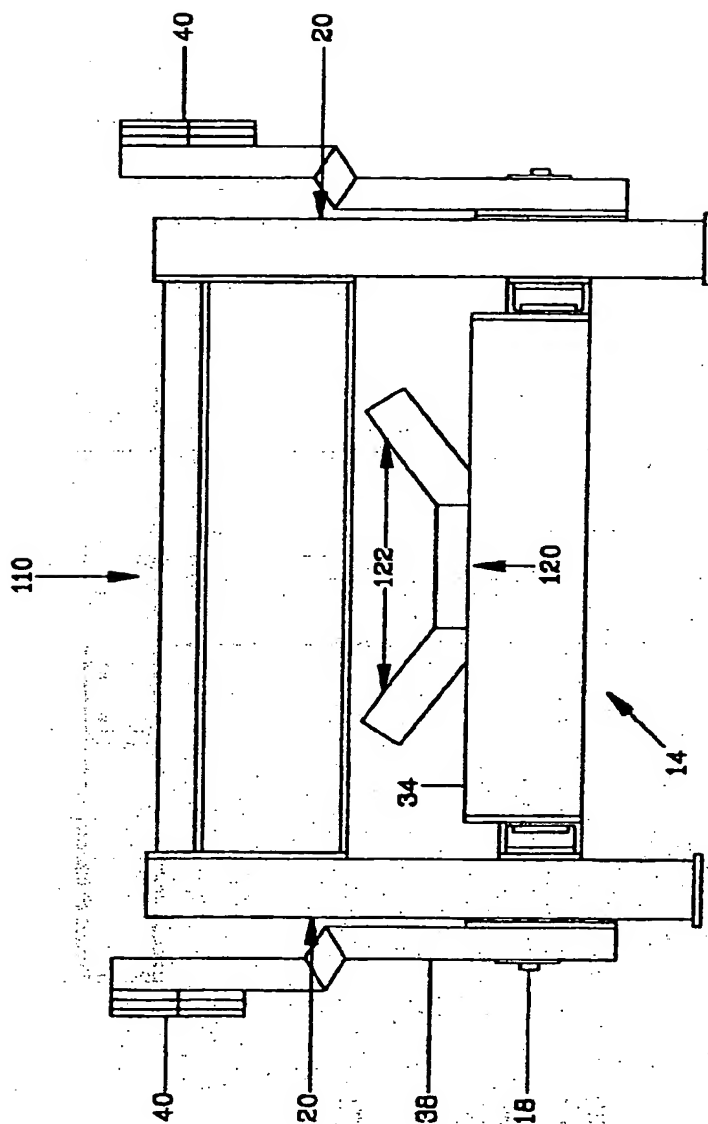


Figure 7

8/11

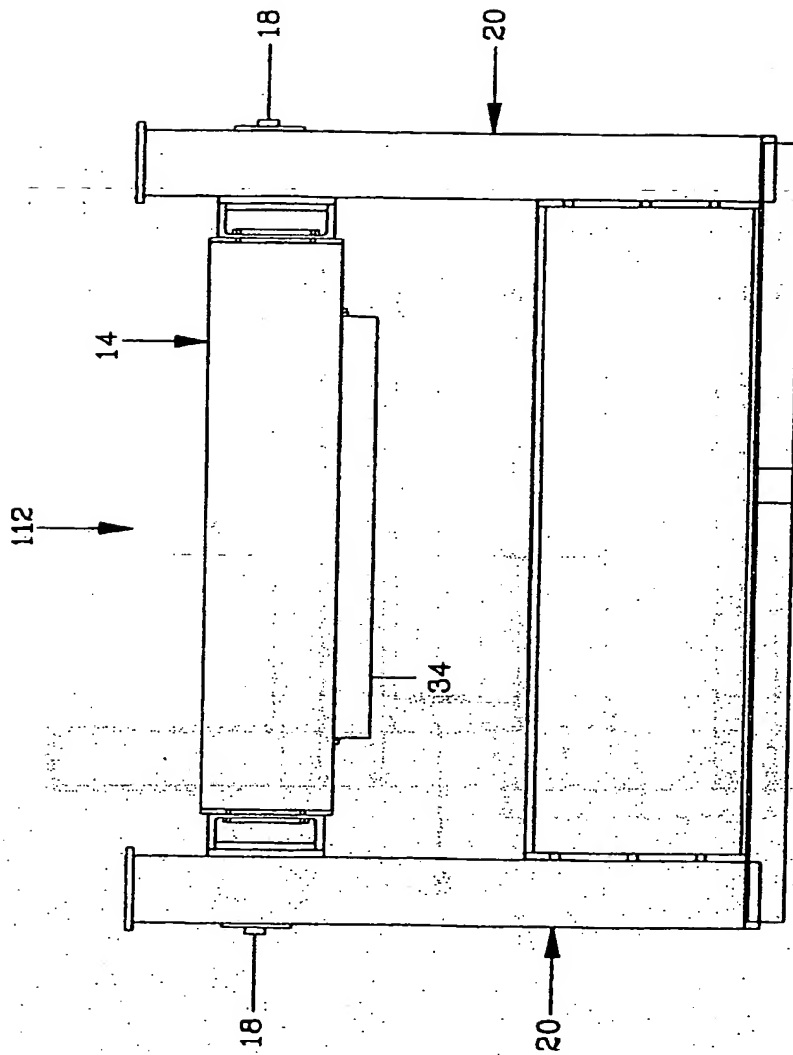


Figure 8

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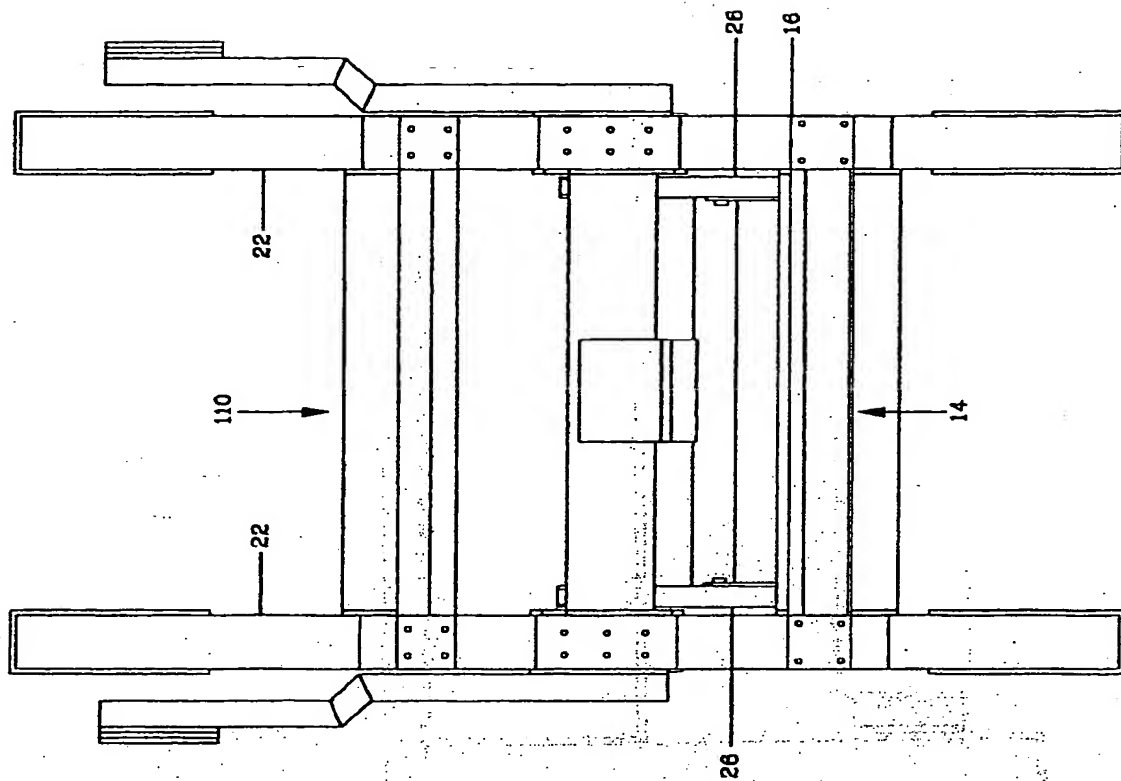


Figure 9

10/11

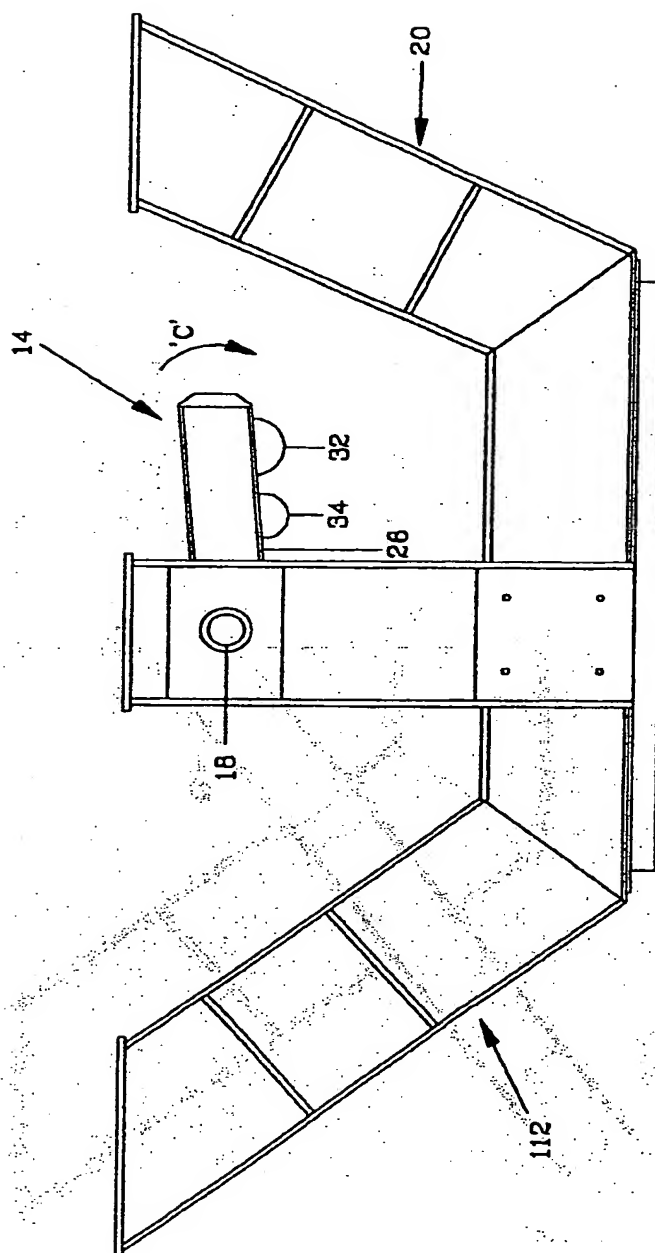


Figure 10

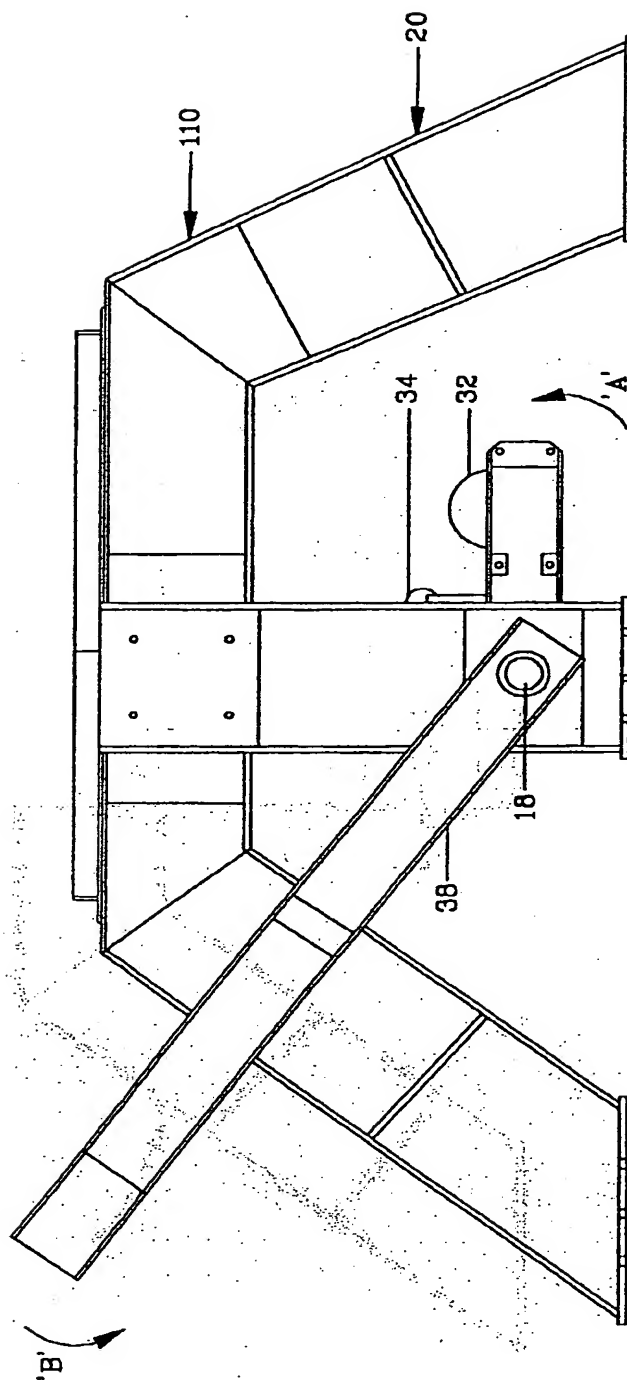


Figure 11

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00012

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B65G43/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 B65G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section PQ, Week 8949, 24 January 1990 (1990-01-24) Derwent Publications Ltd., London, GB; Class Q35, AN 89-363388 XP002147156 & SU 1 467 005 A (SYZRANSK TURBO CONS), 23 March 1989 (1989-03-23) abstract  --- -/--	1-3, 5-9, 13, 15

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

12 September 2000

Date of mailing of the international search report

19. 10. 00

Name and mailing address of the ISA

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Authorized officer

Smolders, R

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00012

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DATABASE WPI Section PQ, Week 8646, 27 November 1986 (1986-11-27) Derwent Publications Ltd., London, GB; Class Q35, AN 86-303872 XP002147157 & SU 1 219 489 A (SKOCHINSKII MINING INST) , 23 March 1986 (1986-03-23) abstract	1-3,5,9, 13,15
X	--- SU 179 666 A (I. GRIDIN ET AL.) 12 April 1966 (1966-04-12) see "extrait de brevet Russe" provided by Derwent	1,2,4,6, 10,13,15
A	--- DE 10 45 321 B (SIEMAG MASCHINEN- UND STAHLBAU NETPHEN GMBH) column 1, line 54 -column 3, line 27 figures 1-3	1-3,5-7, 13,15
A	--- DE 24 19 097 A (HAMMERWERK RICHARD NÄSCHER) 30 October 1975 (1975-10-30) page 7, line 1 -page 10, line 15 figures 1-4	1-3,5-7, 13,15
A	--- DE 296 11 306 U (RHEINBRAUN AG) 2 October 1996 (1996-10-02) page 4, line 15 -page 5, line 19 figure -----	1-3,5,6, 13,15



# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ZA 00/00012

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☒ Claims Nos.: 11, 12  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:  
Rule 6.2 (a) PCT
  
- ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 11,12

Rule 6.2 (a) PCT

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/ZA 00/00012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
SU 1467005	A	23-03-1989	NONE	
SU 1219489	A	23-03-1986	NONE	
SU 179666	A		NONE	
DE 1045321	B		NONE	
DE 2419097	A	30-10-1975	NONE	
DE 29611306	U	02-10-1996	NONE	